

CLAIMS

What is Claimed is:

1. An electronic device packaging assembly for enclosing an electronic device, said assembly comprising:

a base plate including a top surface and a bottom surface, said electronic device being mounted to the top surface of the base plate;

a plurality of electrical vias extending through the base plate;

electrical traces patterned on the top surface of the base plate and being in electrical contact with the vias in a selective manner, said traces including ground traces, signal traces and power traces, said signal traces including an impedance matching compensation network, said device being electrically coupled to the compensation networks to provide impedance matching between the device and the signal traces; and

a ball grid array mounted to the bottom surface of the base plate, said ball grid array including a plurality of balls electrically coupled to the vias in a selective manner to provide electrical connections to the device.

2. The assembly according to claim 1 wherein the base plate is made of a laminate material including a fiber and resin mixture.

3. The assembly according to claim 1 wherein the base plate is made of a material selected from the group consisting of Rogers 4003 and a crystal polymer circuit board material.

4. The assembly according to claim 1 wherein the base plate has a thickness in the range of about 0.005" - 0.008".

5. The assembly according to claim 1 wherein the ball grid array includes ground balls, signal balls and power balls.

6. The assembly according to claim 5 wherein the balls of the ball grid array have a predetermined ball pitch, and wherein certain of the balls around the signal balls that would satisfy the ball pitch are depopulated to make the signal balls coaxial with a ground plane patterned on the back surface of the base plate.

7. The assembly according to claim 6 wherein the ball pitch is 0.030".

8. The assembly according to claim 1 wherein the balls have a ball diameter of about 0.18".

9. The assembly according to claim 1 wherein the compensation network includes a capacitive stub and an inductive stub to provide capacitive and inductive impedance matching that reduces parasitic losses.

10. The assembly according to claim 1 further comprising a cover, said cover being mounted to the top surface of the base plate to seal the device therein.

11. The assembly according to claim 10 wherein the cover is sealed to a ring trace patterned around an outer periphery of the top surface of the base plate.

12. The assembly according to claim 1 further comprising a plurality of decoupling capacitors mounted to the top surface of the base plate and being electrically coupled to the device.

13. The assembly according to claim 1 wherein the device operates at speeds from DC to 50 GHz.

14. An electronic device packaging assembly comprising:
a laminate base plate including a top surface and a bottom surface, said laminate base plate being made of a material including a fiber and resin mixture and being less than 0.01" thick;
a plurality of electrical vias extending through the base plate;

electrical traces patterned on the top surface of the base plate and being in electrical contact with the vias, said traces including ground traces, signal traces and power traces; and

an electronic device mounted to the top surface of the base plate on a ground trace, said device being electrically coupled to the power traces and the signal traces.

15. The assembly according to claim 14 wherein the base plate is made of a material selected from the group consisting of Rogers 4003 and a crystal polymer circuit board material.

16. The assembly according to claim 14 further comprising a ball grid array mounted to the bottom surface of the base plate, said ball grid array including a plurality of balls having ground balls, signal balls and power balls electrically coupled to the vias to provide electrical connections to the device, said balls having a ball pitch.

17. The assembly according to claim 16 wherein certain of the balls around the signal balls that would satisfy the ball pitch are depopulated to make the signal ball coaxial with a ground plane patterned on a back surface of the base plate.

18. The assembly according to claim 16 wherein the ball pitch is 0.030" and the balls have a diameter of about 0.18".

19. The assembly according to claim 14 wherein the signal traces include an impedance matching compensation network, said compensation network including a capacitive stub and an inductive stub to provide capacitive and inductive impedance matching that reduced parasitic losses.

20. The assembly according to claim 16 wherein the device operates at speeds from DC to 50 GHz.

21. A high speed electronic device packaging assembly for packaging an electronic device, said assembly comprising:

- a base plate including a top surface and a bottom surface, said base plate being less than 0.01" thick;

- a plurality of electrical vias extending through the base plate, said electrical vias including ground vias, signal vias and power vias;

- electrical traces patterned on a top surface of the base plate, said traces including ground traces, signal traces and power traces, where the signal traces are electrically coupled to signal vias, the power traces are electrically coupled to power vias and the ground traces are electrically coupled to ground vias, said signal traces including an impedance matching compensation network,

said device being electrically coupled to the compensation network to provide impedance matching between the device and the signal traces; and

a ball grid array mounted to the bottom surface of the base plate, said ball grid array including a plurality of solder balls being arranged by a certain ball pitch, said solder balls including power solder balls, signal solder balls and ground solder balls, said power solder balls being electrically coupled to power vias, said signal solder balls being electrically coupled to signal vias and said ground solder balls being electrically coupled to ground vias.

22. The assembly according to claim 21 wherein the base plate is made of a material selected from the group consisting of a Rogers 4003, a crystal polymer circuit board material, and a fiber and resin mixture.

23. The assembly according to claim 21 wherein the base plate has a thickness in the range of about 0.005" - 0.008".

24. The assembly according to claim 21 wherein certain of the balls around the signal solder balls that would satisfy the ball pitch are removed to make the signal solder balls coaxial with a ground plane patterned on the back surface of the base plate.

25. The assembly according to claim 21 wherein the ball pitch is about 0.030".

26. The assembly according to claim 21 wherein the solder balls have a ball diameter of about 0.18".

27. The assembly according to claim 21 wherein the compensation network includes a capacitive stub and an inductive stub to provide capacitive and inductive impedance matching that reduces parasitic losses.

28. The assembly according to claim 21 further comprising a cover, said cover being mounted to the top surface of the base plate to seal the device therein.

29. The assembly according to claim 21 wherein the device operates at speeds from DC to 50 GHz.